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EXAMINER	
GENACK, MATTHEW W	

ART UNIT	PAPER NUMBER
2617	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	09/939,624	ROBERTS, ROBIN U.	
	Examiner	Art Unit	
	MATTHEW W. GENACK	2617	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 March 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *39-62* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *39-62* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date. _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 39, 43-44, 46-47, 51-53, and 57-59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogier *et. al.*, U.S. Patent No. 6,845,091, in view of An *et. al.*, U.S. Patent No. 6,813,272.

Regarding Claims 39 and 52, Ogier *et. al.* discloses a wireless ad hoc multi-hop network comprised of a plurality of mobile nodes (Abstract, Column 3 Lines 7-28, Fig. 1). Each of the plurality of nodes may operate in an off mode and a sleep mode (Column 15 Lines 23-29). Each node maintains a neighbor table that contains an entry for each neighboring node and its operational state; these operational states are lost, heard, and symmetric; in the lost state, the neighboring node is either in the sleep or off mode or out of range (off state), in the heard mode, the neighboring node is turned on and has transmitted a HELLO message, but it may not be able to hear its neighboring nodes (which would qualify as an active, non-relay state), and in the symmetric mode, the node and its neighbor can heard each other (active, relay state) (Column 29 Lines 15-40, Table 3).

Ogier *et. al.* does not expressly disclose an active and non-relay state wherein a node receives data packets addressed to it and transmits data packets sourced from it, yet does not relay any packets addressed to another node.

An *et. al.* discloses a quality of service (QoS)-based routing method for an ad hoc network, whereby the path with the optimum QoS is selected (Abstract, Column 2 Lines 31-38 and 63-65, Figs. 1-17). The total accumulated QoS for a given path is calculated at a current node in said path (wherein said path starts at a designated starting node), and the next node is chosen from the set of neighbor nodes to the current node; neighbor nodes not meeting QoS requirements are excluded from being relay nodes for the particular call being set up (though these excluded nodes send and receive data for QoS determination, they are simply not part of those selected path for the new call) (Column 5 Lines 25-43, Column 9 Lines 1-33, Figs. 1-2, 4, and 6).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to modify the invention of Ogier *et. al.* by providing for an active and non-relay state wherein a node receives data packets addressed to it and transmits data packets sourced from it, yet does not relay any packets addressed to another node.

One of ordinary skill in the art would have been motivated to make this modification because ad hoc network algorithms that involve each node exploring and collecting information associated with all paths involving themselves (that is, all nodes not only sending packets sourced from themselves and receiving packets addressed to themselves, but also acting as relays for various others nodes that are also involved in

collecting path information) require large amounts of time and network bandwidth (An *et. al.*: Column 1 Lines 51-61).

Regarding Claims 43-44, 53, and 57, a node is informed of the operational states of its closest neighbors (Column 30 Lines 1-60).

Regarding Claims 46-47 and 58-59, when a node is in the lost operational state (due to being in sleep mode, or out of range, *etc.*), it is both a non-infrastructure component and a non-group member, in that it is isolated from the rest of the ad hoc nodes (Column 29 Lines 19-31).

Regarding Claim 51, each node comprises a topology table that stores details of connections to said node's neighbors (Column 10 Lines 7-21).

3. Claims 40-41, 45, and 54-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogier *et. al.* in view of An *et. al.*, further in view of Orava, U.S. Patent Application Publication 2002/0071477.

Neither Ogier *et. al.* nor An *et. al.* expressly discloses that the operational state of each respective node is determined using configuration information received from their respective users and neighboring nodes.

Orava discloses a wireless device, a plurality of which are used in an ad hoc network, the plurality of wireless devices acting as nodes connected to each other (Abstract, [0016], [0020], Figs. 1-3). Each wireless device may operate in one of several states, including a standby state and a connection state, whereby in order to establish a connection route, a wireless device discovers other wireless devices in its area that are available ([0043]-[0049], Fig. 6). When a wireless device is attempting

to make a connection, it is in an inquiry substate, and it receives user information and network information in the form of Bluetooth device addresses and clock information of all wireless devices that respond to the inquiry; the master determines which wireless devices are in the default standby state, and therefore, available as slaves ([0044]-[0045], [0047]).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to modify the invention of Ogier *et. al.* as modified by An *et. al.* by providing for nodes that have operational states that are determined by configuration information received from their respective users and neighboring nodes.

One of ordinary skill in the art would have been motivated to make this modification in order to facilitate the establishment of new connections (Orava: [0044]).

4. Claims 42 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogier *et. al.* in view of An *et. al.*, further in view of Susnow *et. al.*, U.S. Patent Application Publication 2002/0159385.

Ogier *et. al.* discloses the ability for a node to be in a state that is active and non-relay, as outlined above.

Neither Ogier *et. al.* nor An *et. al.* expressly discloses the reception, by a wireless device node, of credits for the relaying of packets.

Susnow *et. al.* discloses the use of flow control credits in the transmission of data packets in a wireless network, and the comparison of the current number of accumulated credits with a credit threshold, in the context of data sent from a source

node to a destination node by way of intermediate nodes in a wireless network ([0017], [0037], [0071]).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to modify the invention of Ogier *et. al.* as modified by An *et. al.* by providing for the reception, by a wireless device node, of credits for the relaying of packets, and the comparison of the current number of credits of that node with a maximum number of credits allocated for that node.

One of ordinary skill in the art would have been motivated to make this modification so as to prevent any one node from being inundated with an excessive number of packets to be relayed (Susnow *et. al.:* [0071]).

5. Claims 48-50 and 60-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogier *et. al.* in view of An *et. al.*, further in view of Larsen *et. al.*, U.S. Patent No. 6,810,428.

Ogier *et. al.* discloses the use of laptop and desktop computers as the nodes, which may be line powered (Column 5 Line 58 to Column 6 Line 7).

Neither Ogier *et. al.* nor An *et. al.* expressly discloses the grouping of wireless device nodes by class, a class being selected from the group of classes comprising nodes connected to line power, nodes with a high remaining battery life, nodes with the least interference, nodes with the least available energy, and high performance nodes.

Larsen *et. al.* discloses a wireless communications network comprised of multiple mobile terminals, along with a method of operating such a network (Abstract,

Column 1 Lines 30-35, Fig. 1). The user terminals comprise transceivers that are able to transmit wireless communications data to destination user terminals or receive wireless communications data from destination user terminals by way of intermediate user terminals in the same network (Column 4 Lines 34-37 and 51-63, Column 5 Lines 4-9, Fig. 1). The user terminals comprise controllers that are able to allow or prevent the transmission of said wireless communications data based on routing data related to the powers required for transmission, powers available for transmission, connection quality, and the potential levels of interference between neighboring user terminals (Abstract, Column 1 Lines 40-45 and 64-66, Column 2 Lines 15-38, Column 4 Line 65 to Column 5 Line 3, Column 16 Lines 53-61, Column 25 Lines 26-35).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to modify the invention of Ogier *et. al.* as modified by An *et. al.* by grouping nodes by class, a class being selected from the group of classes comprising nodes connected to line power, nodes with a high remaining battery life, nodes with the least interference, nodes with the least available energy, and high performance nodes, whereby an immediate neighbor node is set to either the connection state or the standby state when a node belongs to one of these classes.

One of ordinary skill in the art would have been motivated to make this modification because required power levels, available power, and interference are common concerns in wireless networks, especially ad hoc wireless networks, which involve low power devices and data being sent via several links.

Response to Arguments

6. Applicant's arguments filed 27 March 2008 have been fully considered but they are not persuasive.

Applicant asserts, on Pages 8-9 of Remarks, that the Heard state disclosed by Ogier *et al.* does not constitute an active, non-relay state because of three possibilities associated with said Heard state: "

1. Node B can not hear node A, and A-B is the only available link.

2. Node B can not hear node A, but an alternate link is available for return communication from A to B.

3. Node B can hear node A. This is a transitory condition that will become the "Symmetric" state, since B must soon hear node A's Hello message. In the interim, Node B will operate as 1 or 2, above." Applicant further asserts that "For #1, while Node B is functional and not relaying data, it is not active in the network because it cannot receive it's [sic] own data." On the contrary, Node B is active precisely because, as Applicant admits, it is functional (*e.g.*, not turned off or in a sleep mode). Applicant also asserts that "Case #2 describes Node B that is active in the network, since both a B-to-A and A-to-B links [sic] exist. So Node B can both send and receive traffic. But there is nothing in the state information to differentiate between types of traffic, so it will both send and receive it's [sic] own traffic as well as send and receive other traffic (relay). So the equivalent state is "active, relay."" On the contrary, if Node A does not know whether or not Node B can hear it, then Node A obviously cannot directly use Node B to relay data from Node A, and therefore, for the purposes of Node A sending

data to a given destination, Node B is not in a relay state, and therefore Node A considers Node B to be in a non-relay state.

Applicant states, on Page 10 of Remarks, that "Applicant respectfully disagrees with the explanation in the Office Action page 3, last paragraph, that efficiency is important..." In an ad hoc multihop network, bandwidth efficiency is very important because several nodes in close proximity are sharing spectrum. Efficiency in the use of node processing resources is clearly also important, because each node may have other tasks to perform (for instance, each node may be a laptop computer performing tasks for a user, in addition to routing data).

Applicant asserts, on Page 11 of Remarks, that the flow control mechanism of Susnow *et al.* is not extendable to economic credits because said flow control mechanism of Susnow *et al.* is not invoked when economic credits are depleted, but rather to prevent inundation of a node. In an ad hoc multihop network, economic compensation is given precisely because the use of a given node's resources by the rest of the network justifies economic compensation, since, as outlined immediately above, a node's resources that are used for relaying data cannot be simultaneously used for performing tasks for the user of said node.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew W. Genack whose telephone number is 571-272-7541. The examiner can normally be reached on Flex.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duc Nguyen can be reached on 571-272-7503. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO

Customer Service Representative or access to the automated information system, call

800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew W Genack/

Examiner, Art Unit 2617

/VINCENT P. HARPER/
Supervisory Patent Examiner, Art Unit 2617